United States Patent [19]

Hue

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[54] **APPARATUS FOR MEASURING THE VERTICAL ACCELERATION DUE TO THE SWELL**

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[52] **U.S. Cl.** ..... **73/170 A**

[58] **Field of Search** ..... 73/170 A

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,769,838 11/1973 Buckler ..... 73/170 A

OTHER PUBLICATIONS

"A System for the Routine Measurement of Directional Wave Spectra . . ." by Steele et al., from Oceans '78, The Ocean Challenge, pp. 614–621, Sep. 1978.

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[57] **ABSTRACT**

A buoy has accelerometers and magnetometers for measuring characteristics of an ocean swell. The main plane of the buoy floats on and follows the motion of the free surface of the ocean water. A first accelerometer and a magnetometer are mounted on the buoy and oriented along the axis which is perpendicular to the main plane of the buoy (i.e. perpendicular to the surface of the ocean swell). A pair of accelerometers and magnetometers are mounted in the main plane of the buoy and are oriented along mutually perpendicular axes of that plane. The swell caused acceleration vector is perpendicular to the main plane (i.e. the free surface of the water). The accelerometer oriented perpendicular to the main plane measures the sum of the swell caused acceleration vector and the projection of the gravity vector along the axis of the buoy. The mutually perpendicular pair of accelerometers mounted in the main plane measure the projection of the gravity vector in the main plane of the buoy. The projection of the gravity vector along the axis perpendicular of the buoy are derived from the values of the gravity vector and of the gravity vector components in the main plane of the buoy. The value of the projection of the gravity vector is deducted from the value measured by the first accelerometer for obtaining the acceleration vector due to the swell.

5 Claims, 10 Drawing Figures